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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,000	01/17/2007	Hiroyuki Kanbara	36856.1455	1561

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MURATA MANUFACTURING COMPANY, LTD.
C/O KEATING & BENNETT, LLP
1800 Alexander Bell Drive
SUITE 200
Reston, VA 20191

EXAMINER	
EOFF, ANCA	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
10/10/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JKEATING@KBIPLAW.COM
uspto@kbiplaw.com

Office Action Summary	Application No.	Applicant(s)	
	10/596,000	KANBARA ET AL.	
	Examiner	Art Unit	
	ANCA EOFF	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20,22-29,31 and 33-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20,22-29, 31 and 33-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 20, 22-29, 31 and 32-36 are pending in the application. Claims 1-19, 21, 30 and 32 are canceled.

2. The foreign priority document JP 2003-393551 filed on November 25, 2003 was received and acknowledged. However, in order to benefit of the earlier filing date, a certified English translation is required.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 29, 2008 has been entered.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 20, 22-24, 26-27, 29, 31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US Pg-Pub 2002/0160313) in view of Frechet et al. (US Patent 5,648,196).

With regard to claims 20 and 31, Park et al. disclose a photopolymerization type photosensitive paste comprising:

- a water-soluble polymer, such as cellulose derivatives or copolymers containing water-soluble monomers (par.0022);

- monomers or oligomers (par.0023);

- a photoinitiator (par.0024), and

- an inorganic flurorescent powder which includes metals (par.0025).

In Examples 1 and 2 (table 2, par.0036), Park et al. show photosensitive paste compositions comprising:

- HEC (hydroxyethyl cellulose) or HPC (hydroxypropyl cellulose) as binders;

- pentaerythritol triacrylate (PETA) as multifunctional monomer and 2-hydroxyethyl acrylate (HEA) as single functional monomer;

- HSP-188 as UV ray photoinitiator and

- fluorescent material.

In Examples 1 and 2, the ratio (photosensitive monomers) /(photosensitive monomers+polymeric binder) is about 0.833.

The polymeric binder could be comprised in the photosensitive paste composition in an amount 1-15% (par.0032) and the Examples 1, 2 show an amount of polymeric binder of 3%. By further reducing the amount of polymeric binder within the

limits indicated by Park et al., the limitation regarding the ratio required by the instant application is met.

Park et al. further disclose that the photopolymerization type photosensitive paste comprises:

- 73 % by weight of fluorescent material, equivalent to the inorganic powder of the instant application;

- 24% of monomers (PETA, HEA), and

- 0.024 % of photopolymerization initiator (HSP-188) (Example 2 in table, par.0036), based on the total amount of florescent material, monomers and photopolymerization initiator.

The amount of photopolymerization initiator of Park et al. is not in the range required by the instant application.

However, it is well-known in the art that by increasing the amount of photopolymerization initiator/photoinitiator, the sensitivity of the photopolymerizable composition increases, as evidenced by Frechet et al. (column 12, lines 15-18 and fig.2). The amount of photopolymerization initiator/photoinitiator in a photopolymerizable composition is a result-effective variable, having influence over the sensitivity of the composition and therefore it may be optimized.

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result- effective variable.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy). (MPEP 2144.05-II.B).

It would have been obvious to one of ordinary skill in the art at the time of the invention to increase the amount of photopolymerization initiator in the composition of Park et al., in order to increase the sensitivity of the photopolymerizable paste.

Park et al. further disclose a method of forming a fluorescent film using the photopolymerization type photosensitive paste, said method comprising the following steps:

- preparing the photosensitive paste composition;

- coating the composition on a glass substrate;

- exposing the dried composition, and

- developing with pure water to form a flurorescent film (par.0013).

With regard to claims 22 and 33, Park et al. further disclose that the photopolymerization type photosensitive paste may comprise monomers having a double bond concentration within the range of about 8 mmol/g to about 11 mmol/g, such as dipentaerythritol hexaacrylate (par.0023).

With regard to claims 23 and 34, Park et al. further disclose that the photopolymerization type photosensitive paste may comprise monomers having an ethylene oxide structure with a degree of polymerization of about 3 or less, such as ethyleneglycol diacrylate, methyleneglycol bisacrylate (par.0023).

With regard to claims 24 and 35, Park et al. further disclose that the photopolymerization type photosensitive paste may comprise a hydroquinone-type UV stabilizer (par.0027) , equivalent to the ultraviolet absorber of the instant application.

With regard to claim 26, Park et al. further disclose that the binder polymer used in the photopolymerization type photosensitive paste is preferably soluble in both water and organic solvents, more preferably soluble in water in order to use pure water as development liquid in view of cost, working environment and environmental pollution (par.0030).

While Park et al. do not specifically disclose a solvent used as development liquid, one of ordinary skill in the art would have the motivation to use a solvent as development fluid in order to dissolve and remove the binder, if a solvent-soluble binder is present in the composition of the photopolymerizable paste.

With regard to claim 27, Park et al. disclose an exposing step, which consists in aligning the mask and exposing the dried paste to radiation (par.0032). It is examiner's position that the exposure step does not involve any contacting of the paste film with the photomask.

With regard to claim 29, Park et al. further disclose that the thick film pattern is baked at 450-550^{o}C (par.0032), equivalent to the firing step of the instant application.

6. Claims 25 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US Pg-Pub 2002/0160313) in view of Frechet et al. (US Patent 5,648,196) as applied to claims 20 and 31 and in further view of Crary (US Patent 3,661,576).

With regard to claims 25 and 36, Park teach the process of claim 20 and the composition of claim 31 (see paragraph 5 of the Office Action) but fail to disclose that

the amount of solvent in the photopolymerization type photosensitive paste is about 5% by weight or less.

The amount of solvent in the composition of Park et al. is in the range 20-35 wt.% (par.0021).

However, it is well-known in the art that the amount of solvent added to a photopolymerizable composition can be varied widely in accordance to the viscosity desired for the particular coating method by which the compositions are applied to substrates and films , as taught by Crary (column 12, lines 6-10). The amount of solvent in a composition is a result-effective variable, having influence over the viscosity of the composition and therefore it may be optimized.

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result- effective variable.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy). (MPEP 2144.05-II.B).

It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the amount of solvent added to the paste of Park et al., in order to optimize the viscosity of the paste for coating.

7. Claim 28 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. (US Pg-Pub 2002/0160313) in view of Frechet et al. (US Patent 5,648,196) as applied to claim 20 and in further view of Iguchi et al. (US Patent 6,197,480)

With regard to claim 28, Park modified by Frechet teach the process of claim 20 (see paragraph 5 of the Office Action), wherein in the exposure is performed with UV light and a mask (par.0032) but fail to disclose that the exposure may be performed without using a photomask.

Iguchi et al. disclose a photosensitive paste including inorganic particles and an organic components and a method of producing a plasma display using said composition (abstract)

The process of Iguchi et al. comprises the following steps:

- applying the paste to a film (column 12, line 37);

- exposing the paste, preferably with UV light (column 12, lines 45-62);

Iguchi et al. disclose direct pattern formation by means of a red or blue visible laser beam or Ar ion laser beam may be performed instead of using the mask (column 12, lines 51-53).

- developing the making use of the difference in solubility to developing solution between the exposed and the unexposed portions (column 13, lines 25-27);

- firing the pattern (column 13, line 55).

Due to the fact that the patterning process of Park and Iguchi are directed to a photosensitive paste and are used for producing plasma display devices/panels, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the exposure step of the process of Park by direct pattern formation as disclosed by Iguchi et al.

8. Claims 20, 22-24, 29, 31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oshio et al. (US Pg-Pub 2002/0164542).

With regard to claims 20 and 31, Oshio et al. disclose a photosensitive paste comprising a water-soluble cellulose derivative (A), photopolymerizable monomer (B), an acrylic resin (C), a photopolymerization initiator (D) and an inorganic powder (abstract), wherein the powder may be powdered metal, such as iron, nickel, palladium, tungsten, copper, aluminum, silver, gold and platinum (par.0022).

The photosensitive paste may comprise 10-50 parts by weight of the water-soluble cellulose derivative (A) and 50-90 parts by weight of the photopolymerizable monomer (B) per 100 parts by weight of the total components (A) and (B) (par.0013).

Oshio et al. teach that an amount of monomer (B) of less than 50 parts may lead to insufficient photopolymerization of the composition so the image area dissolves in the developing solution and causes failure of image formation. If the component (B) exceeds 90 parts, fine line resolution reduces (par.0013).

The photosensitive paste may comprise 10 to 50 parts of acrylic resin (C) per 100 parts by weight of the total components (A) and (C).A proportion of component (C) of less than 10 parts is insufficient for development resistance, leading to failure of image formation and if the proportion of component (C) exceeds 50 parts, developability reduces and causes some parts of the non-exposed area to remain on the substrate (par.0014).

Therefore, the teachings of Oshio et al. would motivate one of ordinary skill in the art to optimize the content of photopolymerizable monomer (B) and acrylic resin (C) in

the composition of the photosensitive paste, in order to ensure sufficient photopolymerization of the paste, development resistance while maintaining the developability and the fine line resolution (par.0013-0014).

A composition comprising 10 parts by weight of acrylic resin (C), 10 parts by weight of water-soluble cellulose derivative (A) and 90 parts by weight of monomer (B) meets the limitation of the instant application with monomer (B) /(monomer (B) + acrylic resin (C)) =0.90.

Oshio et al. disclose that the photopolymerization intitiator (D) is comprised in an amount of 0.1 to 10 per 100 parts by weight of the total of components (A) and (B).If the amount of initiator is less than 0.1 part, the composition has reduced curability and when it is more than 10 parts, the absorption by initiator tends to cause undercure in the vicinity of the substrate (par.0016).Therefore, one of ordinary skill in the art would have the motivation to optimize the amount of photoinitiator in the photosensitive paste of Oshio et al., in order to ensure the curability and without causing undercure in the vicinity of the substrate.

Oshio et al. further disclose that the photosensitive paste preferably comprises 65 to 90 parts by weight of the inorganic powder and 10 to 35 parts by weight of the organic component comprising the elements (A)-(D) (par.0026).

A paste comprising 65-90 parts by weight of inorganic powder and 10-35 parts by weight of an organic component including 10 parts by weight of acrylic resin (C), 10 parts by weight of water-soluble cellulose derivative (A) and 90 parts by weight of

monomer (B) and photoinitiator (D) in a range between 0.09-9 parts by weight is equivalent to the paste of the instant application comprising:

- 65-90 parts by weight of the inorganic powder;

- 9-30 parts by weight of monomer (B), and

- 0.009-3 parts by weight of the photopolymerization initiator (D).

Oshi et al. further disclose a pattern formation process comprising the steps of:

- forming a layer of photosensitive paste on a substrate;

- exposing to radiation;

- developing with an alkaline developer or water to remove the unexposed area (par.0030).

With regard to claims 22 and 33, Oshio et al. further disclose that the photopolymerization type photosensitive paste may comprise monomers having a double bond concentration within the range of about 8 mmol/g to about 11 mmol/g, such as dipentaerythritol hexaacrylate (par.0009).

With regard to claims 23 and 34, Oshio et al. further disclose that the photopolymerization type photosensitive paste may comprise monomers having an ethylene oxide structure with a degree of polymerization of about 3 or less, such as ethyleneglycol diacrylate (par.0009).

With regard to claims 24 and 35, Oshio et al. further disclose that the photosensitive paste may comprise ultraviolet absorbers (par.0017).

With regard to claim 29, Oshio et al. further disclose that the relief pattern formed after development may be baked (par.0030), wherein the baking is performed at 400 to 600°C (par.0032).

Response to Arguments

9. Applicant's arguments filed on July 02, 2008 have been considered but are moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795